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SOME NOTES UPON THE IMPORTANCE OF LIME IN AGRICULTURE.

By Dr. Oscar Loew.

Lime plays an exceedingly important role in agriculture; on the one hand as an improver of soil conditions and on the other as a mineral nutrient for plants and animals.

The liming of soils with burnt lime is a very old practice and has also been in use on the fields of Porto Rico for centuries. But there exist cases where such liming will not have the effects desired, and where a close examination of the character of the soil will be in order previous to the intended liming. Porto Rico furnishes us such an instance. In the northern and western parts of the island a red stiff clay, very poor in lime and of an acid character, forms one of the most extensive soil types. Here liming with burnt lime is of a threefold benefit: it improves the mechanical condition of the clay by producing a "crumb" structure, it increases the lime content necessary as a plant food, and it diminishes the acidity of the clay though a perfect neutralization with lime would require immense quantities and is thus impractical. Therefore it is no wonder that liming of that soil has increased the cane production 25 per cent on unmanured as well as on soil richly manured with nitrogenous matter and phosphates. See bulletin of the Porto Rico Experiment Station No. 14, page 10.

Quite a different case is met with in certain districts in the southern part of the island. There the clay soil is of an alkaline character and liming with burnt lime would increase this unfavorable condition. The lime must be applied in the form of sulphate, or as it is universally called gypsum. By this means the alkaline carbonates are turned into neutral sulphates, while the sulphate of lime turns into the neutral carbonate of lime.

The great importance of lime as a mineral nutrient for plants and animals becomes at once well understood as soon as we know that lime forms an intimate constituent of the nucleus, cell kernel, of every cell. As soon as a salt, capable of precipitating lime from its solution as for example K- or Na - oxalate, enters into that nucleus it will die under the unusually great contraction. Hence we can safely infer that even a small deficiency of lime in the cells will injure the normal and very important functions of the living cells. This lime content is as important if not more so, with nerves, muscles and skin than with bones and teeth, although it is relatively very small. As regards plants, the leaves are the organs richest in lime, then follow the roots and finally the seeds. The lime content of plants depends not only upon the lime content of the soil but also upon the capacity of the roots to absorb the lime from within the ground. Roots of a very weak acidity will take up much less lime than roots of a more acid character. Hence even on a well limed soil grasses will never show such a high lime content as leguminous plants and many others. Therefore, we should not only treat the meadows in soils poor in lime with finely pulverized carbonate of lime but also should sow clover or vetch or other legumes with the grasses. Thus a hay can be produced containing 12 to 24 grams of lime in one kilo, while hay consisting of grasses only, will generally contain less than 10 grams lime in one kilo, which is too small an amount for effectively carrying on animal husbandry with success. In such cases the poor appearance of the hair of cattle and horses will soon indicate the imperfect metabolism caused by the deficiency of lime.

